Could informality be the solution? An instrumental variable approach on the informality of M/SE in Egypt

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June 2012

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Abstract:

The expansion of the informal sector constitutes one of the major issues in Egypt. Yet, micro and small enterprises (M/SEs) proved their important role on the social and economic level, but most of them are running on an informal basis. That's why this paper tries to estimate the impact of informality on the performance of M/SEs. Relying on an instrumental variable approach, the results showed that the higher is the probability of operating in the formal sector, the higher is the productivity of the firm. This effect is subject to the realization of a specific channel, which accounts for the characteristics of the firm, the entrepreneur and all the constraints faced by the firm. These findings highlight the importance of formalization policies to reduce the expansion of the informal sector.

Keywords: informal sector, Micro and small enterprises, productivity, Egypt.

JEL: O17, C36, D22, L25

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[1] Micro and small enterprises

I- Introduction

The increasing role played by the private sector in the world, is one of the major causes of the substantial reforms held in Egypt between the 80's and 90's. The main target of these reforms consisted in reducing the burden supported by the public sector, by decentralizing the government responsibilities, in order to ensure trade liberalization and employment opportunities. The enhancement of the private sector in Egypt has been reflected by the multiplication of micro, small and medium enterprises (M/SMEs), which can be considered as the core of the productive system (Salles, 2003). As seen in table (1), between 1988 and 1998, the total number of M/SMEs was doubled and produced an increase in job opportunities by 65%. By comparing the size of total enterprises employment in Figure (1), it can be verified that these enhancements are due mainly because of the emergence of micro and small enterprises. That's why, the focus of this paper will be only on micro and small scale enterprises (M/SEs) especially that 92.7% of non-agricultural activities in Egypt are micro enterprises and 6.12% are small enterprises (CAPMAS, 1996).

Therefore, the question of M/SEs is very common in Egypt because it is considered as the main source of earning used by poor people. These types of firms play a major role in absorbing the excess of labor force, in creation of permanent employment opportunities and in approving women empowerment.

The 2003 report on the profile of M/SEs presented by the Ministry of Foreign Trade showed that in 2002 the majority of M/SEs was located in the Delta regions and Greater Cairo. The rest was dispersed between the Upper Egypt, North Coast and Canal regions. According to the intensity of self employment by region and gender, they found that self-employment for males is 13.92% in urban areas and 11.26% in rural areas, while self- employment for females is 3.12% in urban areas and 11.58% in rural ones. This difference reflects the importance of region and gender disparities which will be discussed further on in this paper.

More recently, 99% of all establishments in Egypt are micro enterprises, and represent 85% of non agriculture private sector employment and 40% of total employments opportunities (World Bank, 2010).

However, the majority of M/SEs are managed either by their owner without partners, or with family members and relatives, or by some informal workers employed without any formal contracts. That's why 80% of M/SEs in Egypt operate on an informal basis (ElMahdi, 2010), to avoid the registrations cost, the loss of time and taxes. This confirms the fact that there is a causal relationship between the existence of M/SEs and diffusion of informality, since the informal sector is mainly composed of small scale enterprises (ILO report, 1985). Tables (2) shows that informal M/SEs, which are not involved in any legal procedures, increased from 32% to 35% between 1998 and 2006, however with at least one degree of compliance to legal procedures the number of informal firms decreases. According to the location and gender, table (3) indicates that in 2006, the majority of urban areas were composed of formal enterprises owned mostly by men. But the concentration of informal firms in this area was very important 61% compare to 38% in rural areas. Similarly for women entrepreneurs who were mostly located in urban areas. But their percentages in informal rural areas were higher comparing to men owners.

In order to explain this relationship, this paper will first proceed by defining M/SMEs and the informal sector.

On the one hand, the criteria used to distinguish M/SMEs differ across countries and can be divided into two branches; quantitative criteria and qualitative criteria (Abdelhamid and Elmahdi, 2006). The first branch is the most used and identifies M/SMEs by the number of employees, the value of fixed assets and turnover rate per enterprise. The second branch identifies M/SMEs using some legal or institutional conditions. Due to its subjectivity this last criterion is used only in a limited number of countries.

In Egypt, M/SMEs are identified using the quantitative criteria. Based on the definition of the Ministry of Economy and Foreign Trade in its 1998 draft policy document, a micro enterprise includes between 1 and 5 workers, a small enterprise includes between 5 and 14, and a medium enterprise includes between 15 and 49 workers. According to the size of capital, articles 1 and 2 of law (141/2004) state that a micro enterprise employs less than 50,000LE invested capital, and a small enterprise employs less than 1 million invested capital.

On the other hand, the concept of "informal sector" have been introduced by Keith Hart (1972) and the international labor office. Hart focused on the self employment in Ghana, while the ILO concentrated on the informal enterprises in Kenya, by contesting Lewis model (1954) of the unlimited supply of labor, which consider the informal sector as the last resort to avoid unemployment. The disarray generated about studies on the informality, created a necessity to adopt an international definition, which have been adopted by the ILO in 1993.

However, it still exist a lack of a single definition, measure and terminology for the informal sector across countries. This later can be recognized as the shadow economy, the black market, the unobserved economy, etc. it can be defined according to different institutions, regulations and law. And the measure of informality magnitude depends on the type of available data and the model used. Also, the informal sector is very heterogeneous (OECD, 2011 and Fields 2005), because first it covers multiple types of activities; informal workers, informal self employment and informal production by firms. Second, It exists in different locations -can be inside an establishment like a shop, kiosk and apartment, or outside like street vendors.

In Egypt, CAPMAS[2] defines the informal sector as "*the 'unorganized private sector,' which includes: 1) retail trading activities (four employees or less per establishment); 2) manufacturing industries and repair services (nine employees or less per establishment); or 3) business entities that are not covered by law 159/1981, Investment Law 230/1989, and unregistered in the Commercial 17 Registry nor its equivalent"*.

The objective of this paper is twofold. First, it tries to identify to which extent operating informally affects the productivity of M/SEs. To do so, I will rely on an instrumental variable (IV) approach to avoid the endogenity problem existing due to the causal relationship between informality and productivity. This last can reflect the real performance of an enterprise, since it affects directly its profitability and growth. Informality is measured based on whether the M/SE is registered in the tax department and acquired a tax card. As it will be shown bellow, this endogenous variable is instrumented using the severity of tax administration procedures. So by controlling for the characteristics of the owner and the enterprise, the IV approach will show how

[2] Central Agency for Public Mobilization and Statistics

the severity of tax administration procedures affect the probability of registering a firm, then, how this last contributes in the enhancement of the productivity of the firm. Second, using the same methodology, this paper will try to determine the fundamental causes that generate the difference in productivity between male and female entrepreneurs. In both fold, will be highlighted the importance of the financial capital in enhancing the performance of the enterprise as well as its incentive to operate formally.

These objectives will be conducted using the 2003 M/SE dataset collected by the Economic Research Forum (ERF). The sample consists of 5000 private MSEs in eight governorates, selected from three major administrative regions (Metropolitan, Lower Egypt, and Upper Egypt).

Based on this dataset, we found that the more is the severity of tax administration procedures, the lower is the probability of registration of this firm in the tax department, and hence, the lower is its productivity. This effect is subject to the impact of other variables as; those related to the characteristics of the firm (access to technology and infrastructures), of the owner (level of education), of the human capital (age, training and experiences) and the financial capital (credits). Comparing men and women owners, this effect is verified and highlights the fact; that even if the number of women entrepreneurs is very small comparing to men, their presence in the formal sector can widely enhance the productivity of the firm. However, entering the market marks the main constraint faced by women entrepreneurs' to operate formally, due to the social stigma imposed by the family and community.

This paper contributes to two strand of literature; the first concerns the informal economy, while the second involves the role of M/SEs.

First of all, Dessy and Pallage (2001) showed the absence of full formalization equilibrium in developing countries, hence, the informal sector always occupies a large part of the economy. Actually switching from the formal sector to the informal sector, a firm must first downsize its scale. This fact increases its flexibility and its ability to take more risk subsequent to small innovations. The evasion of taxes and absence of legal employment contracts decrease the costs supported by the firm and increase its ability to buy goods with cheaper prices. However, the

productivity and salaries are lowered because of the misallocation of resources, the hard access to formal credits and modern technologies.

The 2006 African Development bank appraisal report showed that on the overall economy's level, operating informally creates a distortion of the economy's regulations, followed by a lack of social security. Hence, it creates a deficit in decent work, a drove away of large scale investment, an underestimated value of GDP and a loss of credibility and trust towards rule of law and formal institutions. This report presents, as well, the formalization procedure as the main challenge that must be overcome by MSEs to develop in Egypt. Taking into consideration the fact that, this procedure depends on the characteristics of each firm, and its success is subject to the alleviation of regulations which govern the tax, licensing and registration procedures.

Gardes and Starzec (2002), analyzing the expansion of the informal market in Poland, they proved that the informal sector is multiplied in periods of crisis and implementation of reforms because it promotes markets with the untradeable (unauthorized) goods with cheaper prices. More generally, participating in the informal sector generates a sort of social multiplier, since participating once in the informal sector reduces the cost related to social stigma and pushes people to participate more and hence, to be trapped into the informality. Especially that informal firm chooses to remain informal not only to evade taxes, but also due to the lack of information about registration procedures and because of fear of punishment associated to unreported payment (World Bank, 2009).

Considering the causes of informality presented by Charmes in multiple reports (1999 and 2002), the increasing rate of unemployment is selected as the main cause of the creation of the informal sector in Egypt. Adding the weakness of the state in enforcing laws[3] and regulations, that creates a wide informal economy operating in the broad daylight. Approving the important role of M/SEs in creating employment opportunities and combating poverty, Law 141/2004 puts the responsibility of M/SEs development under the umbrella of the Social Funds for Development (SFD). Since then, many financial programs have been adopted to provide M/SEs with formal

[3] Example: law 14 of 1964 that fives the state the responsibility of hiring all graduates students in government offices. law 12 of 2003 that must regulate the labor market (rights of employers and employees and assure market flexibility)

source of credits. A joint program has been implemented in 2007, between the SFD and the African development bank, with other financial partners such as World Bank, IMF and UNESCO.

In his study on small scale manufacturing sector, Meyer (2000) discovered that the weak regulatory environment in which survives the M/SEs is not its only constraints. They face a lot of issues concerning their access to finance, training, infrastructure, technology, etc. As shown by Elhamidi (2011) in her study on the gender aspect of M/SEs enterprises in Egypt, the financial capital is a major factor to ensure the survival and success of the firm. However, the size of the tax burden has a negative effect on the size of the financial capital and a positive effect on the expansion of the informal sector.

So, the access to formal financial support as formal loans and credits is considered as the main constraint facing the development and expansion of M/SEs. That is mainly due to high cost and risk associated to small loans given to MSEs. That's why, as explained by ELmahdi and Osman (2003), the majority of MSEs, specially the unregistered ones, moves towards the adoption of other methods of finance as savings, inheritance and other informal source of credits such as "Gameia"[4]

The majority of papers tackling the issue of M/SEs in Egypt focus on its gender aspect. For example, Elhamidi and Başlevent (2010) and Elhamidi (2011) confirmed that the performance of women entrepreneur is better than men counterpart especially that they access more easily to credits. However, they generate less revenue and need a higher amount of human capital to succeed. The gender gap existing in the case of M/SEs reflects two important and contradicting facts in the Egyptian society. It shows how Egyptian traditions create a sort of social stigma against the work of female in the society. At the same time it demonstrates the necessity for female to earn their own livelihood, especially in rural area, due to poverty and difficult conditions of the family.

[4] Rotating informal savings association which is a temporary savings group, for a limited time, and a particular need.

To my knowledge, this paper represents the first empirical attempt to estimate the channel through which operating in the informal sector can affect the productivity of M/SEs in Egypt. As well as to show, the factors causing differences in productivity between male and female entrepreneurs. Indeed, it exist a large literature on the informal sector and its effect on economic variables and performance of firms. However, a lot of details concerning the informal sector in Egypt are heavily under researched, and the majority of available studies are descriptive because of data limitation. Hence, this paper will try to estimate the most suitable solutions to improve the performances of M/SEs, since they represent a large weight in the Egyptian economy but the majorities are operating on an informal basis. In order to identify, afterword, whether it's better to help unregistered M/SEs to be registered by alleviating registration procedures and reducing its cost, or to force MSEs to close down, or to just turn a blind eye to the whole issue.

This paper proceeds as follow; in section II, I will present the definitions of the variables used, as well as their summary statistics. In section III, the estimation strategy will be discussed in details. Section IV analyzes the empirical results, and finally, section V presents the conclusion and policy implications.

II- Data and summary statistics

The data to be used in this paper is obtained from the 2003 M/SE dataset collected by the economic research forum (ERF). The sample consists of 5000 private M/SEs selected from the three major administrative regions in Egypt, which are the Metropolitan region, Lower Egypt region and Upper Egypt region. This dataset covers eight governorates; Cairo, Giza, Alexandria, Assuit, Damitta, Fyoum, Sohag, Gharbeia. The conducted survey is divided into three main sections. The first section is devoted for the identification of the enterprise and the entrepreneur, the second for the characteristics of the enterprise and the entrepreneur, and the third for the workers.

Definition of variables and summary statistics

The explanatory variables chosen in the regressions, presented in the next section, capture the main constraints faced by the firm to increase its performance, as well as its probability of operating in the formal sector. The performance of the M/SE is measured by the logarithm of its productivity, which is a continuous variable calculated by the division of total sales revenue and total workers. While the probability of the firm to operate in the formal sector is captured by a binary variable taking 1 if the M/SE is registered in the tax department and acquired a tax card and zero otherwise.

This last variable is the endogenous variable of interest, instrumented by the severity of tax administration procedures. Based on the logic and the correlation presented in table (4), this instrument respects the exclusion restrictive condition implied by the instrumental variable approach used. This condition assures that the severity of tax administration procedures has no effect on the productivity of the firm, other than its effect through the probability of the firm to operate in the formal sector. Also, graph (1) and (2) show the negative relationship between the endogenous formality variable and its instrument, and between this last and the productivity of the firm. This negative relationship emphasize the extent of bureaucratic rules in Egypt, which cause a waste of money and time to complete all the procedures; beginning by the licensing stage and followed by the operating, inspection and investigation, taxation and procurement of finance stages.

The explanatory variables chosen are of two kinds, some are continuous as; age of the firm's owner, the level of salaries given to employers. while the rest of the variables are binary as; the gender of the owner, whether he/she acquired a formal level of education, whether he/she has partners, whether the form is located in the urban or rural area, as well as in the metropolitan, upper or lower Egypt. In addition of whether the firm face a certain level of competition; whether it has access to technology, infrastructure. And, finally whether the capital used by the firm is based on savings, inheritance or credits[5].

On one hand, Table (5) shows that 97% of the firms included in the sample are micro enterprises managed by the owner, and only 24% of them have partners. This confirms the fact that the

[5] appendix (1) : list of a detailed definitions of variables

majority of Micro enterprises favor the self employment. That's why the characteristic of the owner must be taken into consideration. First, this characteristics show the gender gap existing in this kind of firms since 89% of entrepreneurs are male with a mean age of 40 years. So that, only 10% are female and the majority of them could be whether non-wage workers or housewives, because of the tradition that create a social stigma against the work of female in the society. Second, it indicates that only 3% of entrepreneurs have acquired a formal education level. But, 29% have acquired trainings or experiences related to their activity and 19% have access to moderate level of technology. These precarious levels could have a negative effect on the overall performance of the firm, as well as on the understanding of the rule of law and regulations related to their activity.

Most of the firms are located in urban area of the metropolitan region, in order to be close to the population density. However, of the total firms in the sample, only 36% have access to infrastructure which reflects the access to water, electricity and roads. With regards to the access to financial capital, savings of the entrepreneur occupy the largest part (68%), followed by inheritance (20%) and credits (5%). That's why the access to a financial capital is a crucial constraint, facing the development of M/SEs in Egypt. It affects, also, the level of salaries paid by the firm which has a mean of 177LE (about 20 Euros) and includes social security and fringe benefits per month. In addition to the severity of tax administration procedures that diminishes the incentive of enterprises to operate in the formal sector.

On the other hand, figure (2) shows that the percentage of formal M/SEs in the sample is higher than informal one (78.53% and 21.47%). Comparing formal and informal firms in table (6), the following is observed; while, the differences in mean of productivity and age of the entrepreneur are not significant between these two sectors[6], the differences recorded by the rest of the variables confirm the advantages perceived by operating formally. Registered firms have more access to infrastructure, technology and credit; and give more salaries. However, the unregistered firms face more competition, are mainly based on owner's savings. Obviously, informal firms assess more severely the tax administration procedures. Unlike the access to training, the mean level of formal education and the concentration of firm in the metropolitan region are higher in the informal sector, as well as the concentration of women, which is a surprising fact.

[6] Appendix (2): distribution of productivity in formal and informal economy

After presenting the situation of M/SEs and the informal sector in Egypt, all related facts will be perceived as challenges that will or won't be confirmed further in this paper.

III- methodology

The methodology consists of two steps using an instrumental variable approach to solve for the endogenity of the registration variable, generated by the causal relationship that exists between the productivity of the small and micro enterprise and its probability of being registered.

In the first step, the dependent variable is defined for the i^{th} micro and small enterprise as: logarithm of productivity which is the logarithm of the division between total sales revenue and total workers. The endogenous variable of interest, probability of being registered in the formal sector, is estimated using the severity of tax administration procedures; logically this variable affects negatively the productivity.

Our theory is that this relationship reflects the effect of the severity of tax administration through the probability of being registered, and ensuring the exogeneity of the instrumental variable. To substantiate this, the productivity of MSE ($lnprod$) is regressed on their probability of being registered ($regis$), and this latter is instrumented by the severity of tax administration procedures($taxadm$). As shown in the equation below

$$lnprod_i = \beta_0 + \beta_1 regis_i + \beta_2 Z + u_i \quad (1)$$

Where Z includes all the exogenous explanatory variables where $cov\ (Z, u) = 0$

The explanatory variables are either continuous as age and salaries or categorical as gender of the owner, partners involved, area and region of the M/SE; competition; access to technology or infrastructure; formal education level and source of initial capital.

As we explained above, *in the first stage regression*, the variable "regis" -the endogenous variable of interest where $cov(regis, u) \neq 0$- is instrumented by "taxadm" variable.

$$regis_i = \pi_0 + \pi_1 taxadm_i + v_i \quad (2)$$

Where $cov\ (taxadm, v) = 0$

After regressing the "regis" variable on its instrument. We include, *in the second stage regression*, the estimated $\widehat{regis}_i$ in the productivity equation, so that

$$lnprod_i = \beta_0 + \beta_1 \widehat{regis}_i + \beta_2 Z + u_i \qquad (3)$$

The second step involves the estimation of two productivity equations explaining how the productivity of M/SEs and their probability of being registered are affected; first when the owner is a man and, second when it's a women. So, first step equations will be used in a similar way but regressed once when the variable gender is equal to one (male owner) and then, when the variable gender is equal to zero (female owner)

Equation (2) and (3) will be

$$\left.\begin{aligned} regis_i &= \pi_0 + \pi_1 taxadm_i + \pi_2 gender + v_i \\ lnprod_i &= \beta_0 + \beta_1 \widehat{regis}_i + \beta_2 gender + \beta_3 Z + u_i \end{aligned}\right\} \text{(gender =0,1)}$$

Hence, first stage estimation will show how severity of tax administration procedures affects the probability of registering the firm when the owner is a man and, then, when it's a woman. Similarly second stage estimation will indicate how the estimated registration variable with other explanatory variable can affect the productivity of the firm in both cases.

IV- Empirical results and discussion

First of all, the Durbin-Wu-Hausman endogeneity test (appendix (3)) proved, by the rejection of the null hypothesis, that endogenous regressor's effects (the registration variable) on the estimates are meaningful, so instrumental variables techniques are required. First stage regression (1) in table (7) shows that this variable is negatively affected by its instrument (severity of tax administration procedure). This relationship is highly significant (-50%) and robust to the inclusion of other explanatory variable (-46%) (regression (2)) and of location control (-41%) (regression (3)). Increasing severity of tax administration procedures typically reduce the probability of acquiring a tax card, which reflect the reality of hard bureaucratic rules

existing in Egypt. This negative relationship was also presented graphically in figure (1), using a two way scatter plot graph.

Considering the results of the first stage regression, I will interpret those of the second stage regression to analyze the overall effects of registration on productivity. So in the following the results of the 1st and 2nd stage estimation are presented (table (7) and table (8) regression (1))

The second stage regression (1) indicates that the estimated productivity of a MSE increases significantly by 65% when it operates in the formal sector and acquires a tax card. Especially that low productive firm has almost nothing to lose by operating in the informal sector and can be ruled out of the market because of its binding position in the market (OECD, 2011). However, this large effect is not direct but it's endogenously determined by the effect of other explanatory variables, as it will be explained bellow;

As we said before, the gender of the owner must be taken into consideration because the majority of firms are run as a "one men show" (Abdelhamid and Elmahdi, 2006). That's why having more partner has a significant negative effect on the productivity of the M/SE (-14%). But has a positive significant effect on the probability of operating formally (30%), because having partners can help in accumulating more initial capital, and so, in facilitating licensing procedures.

Comparing men and women entrepreneur, one can observe that, being a men entrepreneur has a higher positive impact on the registration variable, and hence, on the productivity of the firm. The unfavorable position of female entrepreneur can be explained by Elmahdi and Rashif (2007) who compare the 1998 and 2006 M/SEs situation. They found that the percentage of female entrepreneur dropped by 2% because of their incapacity to face market and community constraint. Furthermore, from the dataset used by this paper, 68% of constraints on female business in M/SE come from family and 30% come from the community. And only 7.2% of the women entrepreneurs in the sample are registered in the tax department.

Considering other characteristics of the owner, while receiving formal level of education has an insignificant effect on the productivity variable, receiving trainings or experiences related to the present activity has a positive significant effect of 6.7%. However, these two variables have a positive significant effect on the probability of being registered (3% and 2% respectively). In fact, multiple papers stressed the importance of human capital as education and training, which

help to improve the performance of M/SEs by taking right decisions and create a secured capital and business.

Beside, Jovanovic (1982)[7] showed that getting older strengthens the experiences acquired by firms' owner; therefore, it has a positive effect on its performance. However, in my estimations, this variable has a poorly significant effect. It affects negatively the firm's productivity and positively its probability of operating formally. that's can be also justified, because the experiences gotten show to this aging persons, the advantages of operating formally and of living a more secure business to his inherited generation.

The location of M/SEs is captured by accounting for the area (rural or urban) and the region (metropolitan, Upper and Lower Egypt), in which the firm operates. As shown in regression (3) of table (7), the amount of registered firms is significantly higher in urban areas of Lower Egypt, comparing with those of metropolitan and Upper Egypt. Despite, the productivity of the firm that is not significantly affected by moving firms from one area to another but decrease by moving from metropolitan to upper or lower regions. In fact, poverty is a dominant feature of rural areas in Egypt, that's why existing M/SEs can be poorly productive, adding their weaker access to infrastructure and technology. So, this result is seems contradictory because most of Lower Egypt region contains rural areas in which the productivity of firms and their probability of being registered are normally lower that urban and metropolitan regions.

Concerning constraints faced by firms in their access to infrastructure, technology and the level of competition faced. The access to a moderate level of technology has a significant positive effect on the registration variable and on the productivity variable. However, the access to infrastructure hasn't a significant on both variables. In addition, the higher is the competition faced by the enterprise, the lower is its ability to register, but the higher is its productivity. Actually there is a vicious cycle between these constraints; the more the firm has access to technology, the higher is its ability to innovate and the more the competition it faces, and the higher is the increase in its productivity. As proved by K.Gupta (2009), small scale enterprises have more incentives to take risks and innovate, but innovations are subject to their access to

[7] Jovanovic, B. 1982. Selection and the evolution of industry, *Econometrica* 50 (3), 649-670. in ELhamidi 2011.

certain level of technology. Also, one can introduce the effect on the level of salaries in this cycle, because in my estimation, level of salaries given by the M/SE has a significant positive effect on registration, as well as on productivity.

As mentioned before, many paper argued the importance of financial capital for the survival of M/SEs. Here, basing the initial capital on savings doesn't affect significantly the probability of operating in the formal sector. But, basing it on inheritance can increase significantly this probability by 37%. These effects are totally inversed with the productivity variable; savings and inheritance decrease the productivity of the firm by 7.7% and 3% respectively. These results highlight the importance of formal way of finance as credits provided by firms. By introducing this variable in regression (4) table (7) and in regression (1) table (8) one can observe an increase of productivity by 17% with higher access to credits. Unfortunately, only 5.26% of surveyed M/SEs has access to credits in our sample. That's why the access to credits doesn't have any significant effect on the probability of registration. Actually this important result must be taken into consideration, with cautions, in policy implications.

To summarize the results of this first model; the higher is the probability of operating in the formal sector, the higher is the productivity of the firm. So, in order to increase this probability, it will be more favorable if the firm is owned by a man and some partners, with a good level of formal education and experience related to the activity. The firm must have access to technology, infrastructure, and a secure way of formal finance to be able to pay higher salaries. Following this results, firm might be located in urban area of metropolitan region to ensure better performance. But, in my case the location of the firm pose a contradictory effect on the performance and the probability of registration as we saw. So, the main result of this part is that; even if the dataset used show a similar mean of productivity between formal and informal M/SEs, the effect of registration on the productivity is very important and must be taken into consideration.

Since the first instrumental variable model showed us that operating in the formal sector has a highly significant effect on the productivity of the enterprise, regardless the gender of the

M/SE's owner. So, this second model (table (9)) tries to discover the different factors that can strengthen the willingness to operate formally in two cases; when the owner of the enterprise is a male and when it's a female.

First of all, regressions (2) and (3) table (8) show that, when the firm is owned by a men or women and operates in the formal sector, its productivity increases by 63.5% and 82.6% respectively. Taking into consideration that the probability of operating in the formal sector increase by 40% and 44% respectively, when tax administration procedure is alleviated. In the same way, these effects are not direct and depend on other variables;

Focusing on table (9), we observe that, in both cases, locating the firm in urban area has the highest effect on the probability of operating in the formal sector (67.5% for male and 77% for female owner), which confirm the result of the first stage (table (7)). Also, this comparison assures that operating in Lower Egypt region is better in term of formality than operating in upper or metropolitan region.

When the entrepreneur is a woman, inheritance is the next variable that highly and significantly contributes in the increase of the probability of registration (74%). Even if savings and credits are not significant, this model verify also that women have more access to multiple types of financial capital. In addition that 74% of surveyed firms reclaimed that women have no problems in benefiting from financial services. On the other hand, the access to infrastructure is the next important variable in men case; it can increase the probability of registration by 36% followed by the inheritance variable that contributes by 30%.

Concerning the importance of human capital, acquiring a formal education level doesn't affect significantly the registration variable in women case because only 1.7% of women entrepreneurs in the whole sample acquired a level of formal education. This variable has a poorly significant effect on the registration variable in men case. However, trainings and related experience have higher positive effects when the owner is a woman. Regarding, the access to infrastructure and partnerships, the first has higher effect with women entrepreneurs; it increases the registration variable by 43%. While the second hasn't a significant effect in case of women owners, it increases the probability of registration by 26% with male owners. Similarly for the level of competition faced by the firm, that decreases the probability by 26.5% in men case.

As I mentioned several times, many paper on the gender aspect of M/SEs in Egypt and other countries, proved that women entrepreneur can be better performing but they generate less profits and revenues. This fact is verified in this paper, adding that the performance of a woman owned enterprise can widely enhance if it operates in the formal sector. However, constraints faced by women because of their family and society prevent them to improve their position in the M/SE sector.

V- Conclusion

This paper focus on the informality of micro and small enterprises in Egypt, which is one of the most important and effective component of the private sector in Egypt. In fact, the issue of informality and the important role of M/SEs have been discussed separately in the literature and on public policy levels, but in a descriptive way and without any attempts to test it empirically. That's why this paper tries to identify; how the performance of a firm can be affected by operating in the informal sector, as well as the channel through which this effect happens. Adding the attempt to verify the results of the existing literature on the gender aspects of M/SEs, this paper try to test the way this channel impact when the entrepreneur is a man and when it's a woman.

Since this paper proved that formal M/SEs are better performing and contributes highly in the economy, turning a blind eye against the issue of informality can never be the solution. Hence, effective policies are needed to manipulate the initiatives of these firms toward formalization procedures. These policies must, first, alleviate the registration procedures, and then, highlight the advantages of the formal sector. In Egypt, these kinds of policies are not enough, because entrepreneurs need to feel the differences by operating formally and specially, the benefits behind the payment of taxes. To do so, public policy levels must be aware of the channel through which the formality realize its advantages, by accounting for the characteristics of the firms, of the entrepreneurs, of the operating environment and of all the constraints faced by firms. In order to be able to provide them the most suitable solutions; by facilitating the access to finance, education and training.

With more available data this paper can be extended by performing panel estimation in order to introduce more dynamics and to be able to verify the trend of the effect of informality on M/SEs' performance. A randomized experience can also be effective, to identify the better channel able to induce the formalization procedure. Hoping that the results found in this paper can be useful to open the path toward more empirical attempts in the field of informality and M/SE, to help policy makers in drawing better plans and strategies.

Tables

Table (1): Distribution of M/SMEs according to their number and employment

year	1986		1996	
	Number	Employment	Number	Employment
Micro	1,049,508	1,585,971	1,531,212	2,571,688
Small	41,005	252,778	82,646	500,893
Medium	15,073	267,560	23,454	410,961
Total	1,105,586	2,106,309	1,637,312	3,483,542

Source: CAPMAS'1996 Establishments Census.

Table (2): The degree of compliance to the legal procedures in 1998 and 2006

No. of procedures	1998		2006	
	Count	Percent	Count	Percent
0	474	32.0	750	35.0
1	207	13.0	240	11.0
2	547	37.0	771	36.0
3	269	18.0	381	18.0
total	1497	100.0	2142	100.0

Source: Elmahdi and Rashed (2007) ELMS98 and ELMPS06 data files.

Table (3): Geographical distribution of M/SEs according to formality and gender of the owner (%) 2006

Location	Formal			Informal		
	Male	Female	Total	Male	Female	Total
Urban	91.9	77.5	90.7	62.9	55.4	61.5
Rural	8.1	22.5	9.3	37.1	44.6	38.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Elmahdi and Rashed (2007) ELMS98 and ELMPS06 data.

Table (4): Correlations between the productivity, registration and severity of tax administration variables

variables	Registration	ln (productivity)	Tax adm
Registration	1.0000		
ln (productivity)	0.1030***	1.0000	
	(0.0000)		
Tax adm	-0.2593***	-0.0387***	1.0000
	(0.0000)	(0.0072)	

Notes: significance levels are between parentheses. *** Significant at, or below, 1 percent. ** Significant at, or below, 5 percent. * Significant at, or below, 10 percent.

Table (5): descriptive statistics of main variables

variables		N	mean	Standard deviation	min	max
		Dependant variable				
ln(productivity)		4827	6.020	1.055	1.60	12.61
		variable of interest				
registration		4956	0.785	0.410	0	1
		characteristics of entrepreneurs				
gender		4958	0.895	0.306	0	1
age		4956	40.335	13.40	14	83
Formal education		4956	0.029	0.169	0	1
training or experience related to present activity		4958	0.298	0.457	0	1
partners		4950	0.249	0.453	0	2
		characteristics of entreprise				
location	Urban	4958	0.894	0.307	0	1
	metropolitan	4958	0.477	0.499	0	1
	upper	4958	0.344	0.475	0	1
	micro	4958	0.973	0.161	0	1
competition		4951	0.272	0.445	0	1
technology		4936	0.190	0.392	0	1
infrastructure		4958	0.369	0.482	0	1
salaries		4956	171.39	223.1	0	7264.7
		source of financial capital				
inheritance		4958	0.202	0.401	0	1
sav		4958	0.685	0.464	0	1
credits		4958	0.052	0.223	0	1
		Instrumental variable				
		4943	1.856	0.785	0	3
Severity of tax administration procedures	easy	477	9.65			
	moderate	499	10.1			
	difficult	3,223	65.2			
	not applicable	744	15.05			

Source: M/SE'03 data files. Computation by the author

Table (6): Descriptive statistics for formal and informal M/SEs

Variables		informal	formal	total
			mean	
ln(productivity)		5.810794	6.077113	6.020758
		characteristics of entrepreneurs		
gender		0.8524436	0.9069887	0.895279
age		39.84008	40.46441	40.33044
Formal education		0.2293233	0.033419	0.029471
training or experience related to present activity		0.0150376	0.3168037	0.298023
partners		0.1420508	0.2795367	0.25
		characteristics of entreprise		
location	urban	0.8223684	0.913926	0.89427
	metropolitan	0.6109023	0.4411614	0.477603
	upper	0.3016917	0.3561151	0.344431
Competition		0.3505639	0.251158	0.272525
technonolgy		0.140965	0.2037658	0.190312
infrastructures		0.2434211	0.4036485	0.369249
salaries		145.1803	178.5933	171.417
		source of financial capital		
inheritance		0.1203008	0.2250771	0.202583
savings		0.7734962	0.6616136	0.685634
credits		0.0394737	0.0562693	0.052663
		Instrumental variable		
Severity of tax administration		2.246692	1.750193	1.856507

Source: M/SE'03 data files. Computation by the author

Table (7)

Registration and severity of tax administration procedures (First stage)

Dependent variable: probability of acquiring a tax card at start up

Explanatory variables	Probit estimations			
	(1)	(2)	(3)	(4)
Severity of tax adm	-0.503***	-0.462***	-0.414***	-0.414***
	(0.0407)	(0.0409)	(0.0415)	(0.0416)
Gender		0.202***	0.152**	0.153**
		(0.065)	(0.0651)	(0.0651)
Partners		0.306***	0.299***	0.297***
		(0.0558)	(0.0556)	(0.0557)
Formal education		0.323**	0.340**	0.337**
		(0.155)	(0.156)	(0.156)
Training & exp		0.192***	0.199***	0.200***
		(0.0497)	(0.0503)	(0.0502)
Age		0.00354**	0.00422***	0.00420***
		(0.00157)	(0.0016)	(0.0016)
Infrastructure		0.132	-0.0239	-0.024
		(0.26)	(0.268)	(0.268)
Technology		0.111*	0.127**	0.127**
		(0.0588)	(0.0598)	(0.0599)
Competition		-0.265***	-0.289***	-0.290***
		(0.0462)	(0.0468)	(0.0469)
Salaries		0.000529***	0.000672***	0.000670***
		(0.00015)	(0.00017)	(0.000174)
Savings		-0.0883	-0.0178	-0.009
		(0.0687)	(0.0708)	(0.0716)
inheritance		0.310***	0.362***	0.371***
		(0.0834)	(0.0854)	(0.0863)
Urban			0.702***	0.702***
			(0.0711)	(0.0711)
Region			0.233***	0.232***
			(0.0294)	(0.0294)
credits				0.0778
				(0.109)
Constant	1.781***	1.231***	0.041	0.0314
	(0.0885)	-0.138	(0.182)	(0.182)
Pseudo R^2	0.0664	0.1061	0.1300	0.1301
Log likelihood	-2395.78	-2274.43	-2213.55	-2213.28
observations	4,941	4,899	4,899	4,899

Notes: Probit regressions. The dependent variable is a dummy variable taking 1 if the M/SE acquired a tax card at strart up of the activity and zero otherwise. Robust standard errors are in parenthesis. *** Significant at, or below, 1 percent. ** Significant at, or below, 5 percent. * Significant at, or below, 10 percent.

Table (8)

Productivity and Registration and (second stage)

Dependent variable: logarithm of productivity

Explanatory variables	Instrumental variable (2sls) regression		
	(1)	(2)	(3)
registration	0.651***	0.635***	0.827**
	(0.19)	(0.198)	(0.414)
gender	0.186***		
	(0.0482)		
partners	-0.144***	-0.146***	-0.156
	(0.0373)	(0.0371)	(0.127)
Formal education	0.139	0.142	0.0907
	(0.0976)	(0.0885)	(0.472)
Training & experience	0.0678*	0.0751**	-0.132
	(0.0346)	(0.0345)	(0.137)
age	-0.00222*	-0.00236*	-0.000597
	(0.00114)	(0.00123)	(0.003)
infrastructures	-0.0413	-0.0299	-0.15
	(0.0351)	(0.0372)	(0.118)
technology	0.260***	0.263***	0.264**
	(0.0394)	(0.0404)	(0.116)
competition	0.257***	0.284***	-0.00271
	(0.0385)	(0.039)	(0.109)
salaries	0.00104***	0.00107***	0.000767**
	(0.000122)	(0.000)	(0.0003)
urban	-0.092	-0.0838	-0.148
	(0.063)	(0.0691)	(0.165)
region	-0.183***	-0.181***	-0.178**
	(0.0233)	(0.0239)	(0.077)
savings	-0.0776*	-0.111**	0.132
	(0.0468)	(0.052)	(0.111)
inheritance	-0.0325	-0.0475	-0.0409
	(0.0556)	(0.0607)	(0.158)
credits	0.170**	0.163**	0.218
	(0.0666)	(0.0703)	(0.212)
Constant	5.635***	5.835***	5.511***
	(0.109)	(0.12)	(0.264)
R-squared	0.112	0.115	0.032
Observations	4,771	4,267	505

Notes: instrumental variable regressions. The dependent variable is the logarithm of productivity of the firm. Robust standard errors are in parenthesis. *** Significant at, or below, 1 percent. ** Significant at, or below, 5 percent. * Significant at, or below, 10 percent.

Table (9)

Registration and severity of tax administration procedures by gender (First stage)

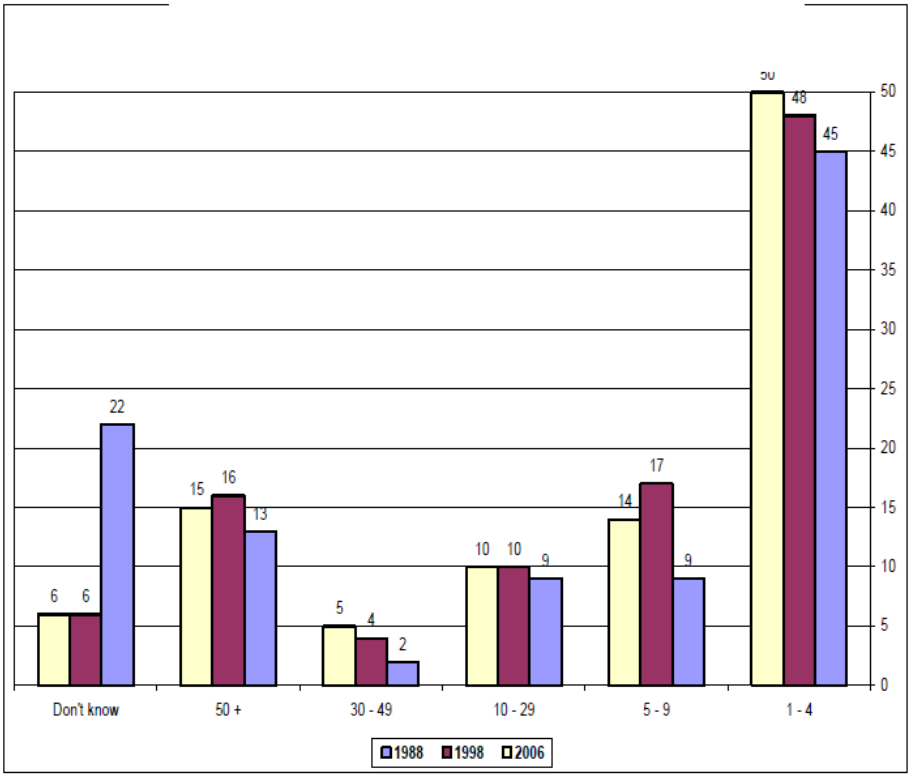
Dependent variable: probability of acquiring a tax card at start up

Explanatory variables	Probit estimations by gender	
	Male (1)	Female (2)
Severity of tax adm	-0.404***	-0.441***
	(0.0447)	(0.111)
Partners	0.266***	0.31
	(0.0583)	(0.209)
Formal education	0.300*	Omitted
	(0.158)	
Training & exp	0.152***	0.546*
	(0.0521)	(0.285)
Age	0.00696***	-0.0048
	(0.00176)	(0.00428)
Infrastructure	0.360***	0.432***
	(0.0515)	(0.156)
Technology	0.0949	0.005
	(0.0632)	(0.198)
Competition	-0.265***	-0.172
	(0.05)	(0.154)
Salaries	0.000426***	0.00258***
	(0.000158)	(0.0007)
Urban	0.675***	0.777***
	(0.0764)	(0.221)
Region	0.235***	0.387***
	(0.0318)	(0.0916)
Savings	-0.0735	0.199
	(0.0804)	(0.189)
inheritance	0.303***	0.744***
	(0.0961)	(0.238)
credits	0.0472	0.179
	(0.116)	(0.304)
Constant	0.0725	-0.446
	(0.191)	(0.49)
Pseudo R^2	0.132	0.2315
Log likelihood	-1925.553	-239.303
observations	4,900	505

Notes: Probit regressions. The dependent variable is a dummy variable taking 1 if the M/SE acquired a tax card at strart up of the activity and zero otherwise. Robust standard errors are in parenthesis. *** Significant at, or below, 1 percent. ** Significant at, or below, 5 percent. * Significant at, or below, 10 percent.

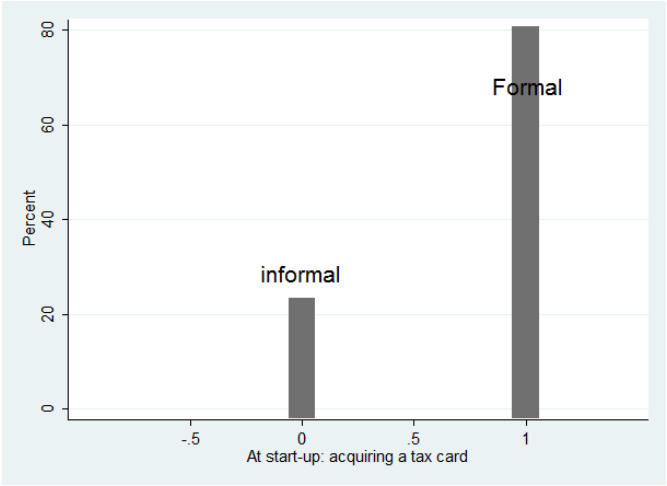
Figures

Figure (1): Size of enterprises employment formal/ informal in 1988-1998-2006



Source: Elmahdi and Rashed (2007) ELMS98 and ELMPS06 data files.

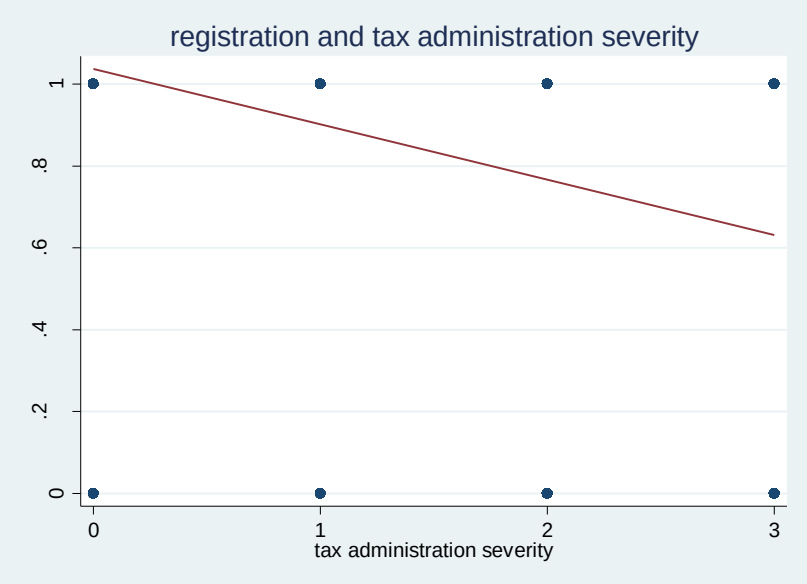
Figure (2): Percentage of formal and informal M/SEs in the sample



Source: M/SE'03 data files. Computation by the author

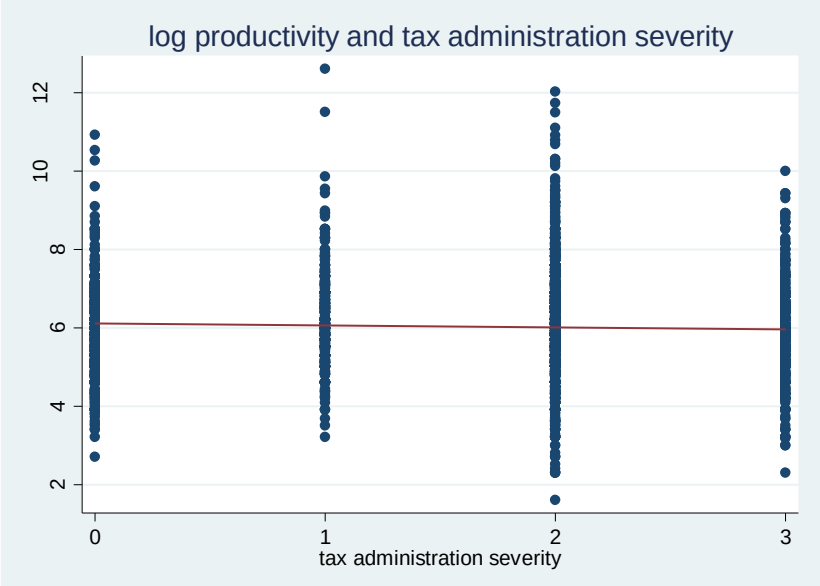
Graphics

Graph (1): Relationship between registration variable and severity of tax administration procedures



Source: M/SE'03 data files. Computation by the author

Graph (2): Relationship between registration variable and productivity



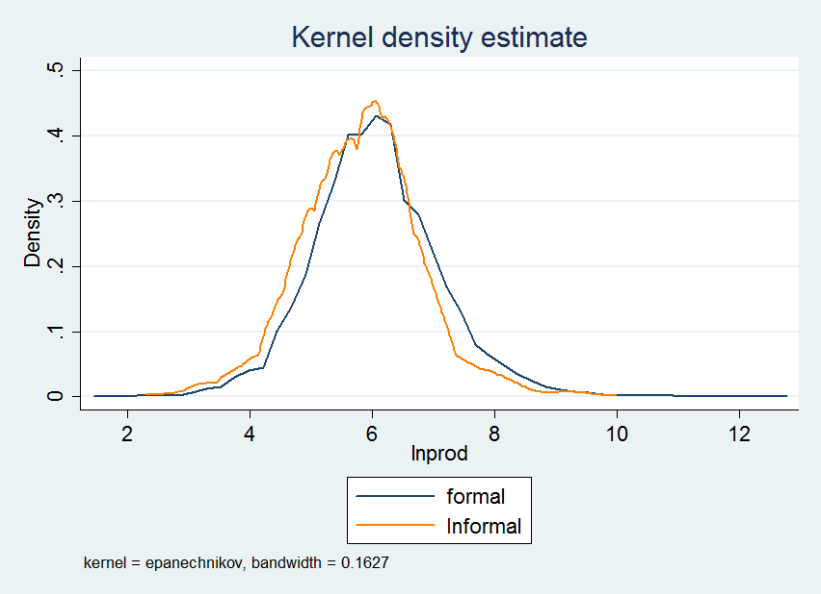
Source: M/SE'03 data files. Computation by the author

Appendices

Appendix (1): List of variables:

- ***ln(productivity)*** is the continuous dependant variable calculated by the division of total sales revenue and total workers
- ***regis*** is the explanatory variable of interest (instrumented), which is a dummy variable taking 1 if the firm is registered in the tax department at start up of the activity and zero otherwise.
- ***severity of tax adm*** is the instrumental variable, which is a discrete variable coded from 0 to 3, for 0=easy, 1=moderate, 2=difficult, 3=not applicable.
- ***gender*** is a dummy variable taking 1 if the MSE's owner is a male and 0 otherwise.
- ***partners*** is a dummy variable taking 1 if the MSE's owner has partners and 0 otherwise.
- ***formal education*** is a dummy variable taking 1 if the MSE's owner had a formal technical or vocational education level and 0 otherwise
- ***training and experience*** is a dummy variable taking 1 if the MSE's owner has experience or training related to the present activity and 0 otherwise.
- ***age*** is a continuous variable showing the age of the owner of the MSE.
- ***infrastructures*** is a binary variable taking 1 if the MSE has access to water, electricity and roads, and 0 otherwise.
- ***technology*** is a binary variable taking 1 if the MSE use a modern technology or an up to date one, zero if it's using a traditional one.
- ***competition*** is a dummy variable showing the level of competition faced by the MSE, taking 1 if the MSE has neighbouring enterprises engaged in activities related to its enterprise, and 0 otherwise.
- ***salaries*** is a continuous variable showing the level of salaries given by the M/SE.
- ***savings*** is a dummy variable taking 1 if the source of initial capital of the MSE is based on savings, and 0 otherwise.
- ***inheritance*** is a dummy variable taking 1 if the source of initial capital of the MSE is based on inheritance, and 0 otherwise.
- ***credits*** is a dummy variable taking 1 if the source of initial capital of the MSE is based on formal credits, and 0 otherwise.
- ***urban*** is a dummy variable taking 1 if the MSE is located in the urban area and zero otherwise
- ***region*** is a discrete variable taking 1 if the MSE is located in metropolitan region, 2 if it's located in upper Egypt region, and 3 if its located in lower Egypt region.

Appendix (2): Kernel density



Source: M/SE'03 data files. Computation by the author

Appendix (3): The Durbin-Wu-Hausman endogeneity test

Tests of endogeneity of: "registration"

H_0: Regressor is exogenous

Wu-Hausman F test:	5.61880	F(1,4754)	P-value = 0.01781
Durbin-Wu-Hausman chi-sq test:	5.63224	Chi-sq(1)	P-value = 0.01763

Notes: by the rejection of H_0, "the registration" variable is endogenous